

JC10 Rec'd PCT/PTO 13 FEB 2002

FORM PTO-1390 (REV 10-94)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADE MARK OFFICE		DOCKET #: 4925-210PUS
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371				
				U.S. APPLICATION NO. (If known, see 37 CFR 1.5) <b>10/049590</b>
INTERNATIONAL APPLICATION NO. <b>PCT/EP99/06660</b>		INTERNATIONAL FILING DATE <b>09 September 1999</b>		PRIORITY DATE CLAIMED <b>09 September 1999</b>
TITLE OF INVENTION <b>In Controlled Multicast</b>				
APPLICANT(S) FOR DO/EO/US <b>Sami USKELA; Aapo RAUTIAINEN; Eva-Maria LEPPÄNEN; Lucia TUDOSE; Mari K. NIEMINEN</b>				
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:				
<ol style="list-style-type: none"> <li><input checked="" type="checkbox"/> This is a <b>FIRST</b> submission of items concerning a filing under 35 U.S.C. 371.</li> <li><input type="checkbox"/> This is a <b>SECOND</b> or <b>SUBSEQUENT</b> submission of items concerning a filing under 35 U.S.C. 371</li> <li><input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).</li> <li><input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.</li> <li><input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))             <ol style="list-style-type: none"> <li><input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau).</li> <li><input checked="" type="checkbox"/> has been transmitted by the International Bureau.</li> <li><input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US)</li> </ol> </li> <li><input type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)).</li> <li><input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))             <ol style="list-style-type: none"> <li><input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau).</li> <li><input type="checkbox"/> have been transmitted by the International Bureau.</li> <li><input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</li> <li><input type="checkbox"/> have not been made and will not be made.</li> </ol> </li> <li><input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</li> <li><input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). <b>Unexecuted</b></li> <li><input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</li> </ol>				
<b>Items 11. to 16. Below concern other document(s) or information included:</b>				
11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.				
12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included				
13. <input checked="" type="checkbox"/> A <b>FIRST</b> preliminary amendment. <input type="checkbox"/> A <b>SECOND</b> or <b>SUBSEQUENT</b> preliminary amendment.				
14. <input type="checkbox"/> A substitute specification				
15. <input type="checkbox"/> A change of power of attorney and/or address letter				
16. <input checked="" type="checkbox"/> Other items or information ( <i>specify</i> ). PCT Publication Sheet, Int'l Preliminary Examination Report, Written Opinion, PCT Request, Information Concerning Elected Offices Notified of their Election, Notice Informing the Applicant of the Communication of the International Application to the Designated Offices, Notification of the Recording of a Change (Nokia Telecommunication to Nokia Networks Oy), Notification of the Recording of a Change (Nokia Networks Oy to Nokia Corporation), and Notification of Receipt of Record Copy				

JC12 Rec'd PCT/EP 13 FEB 2002

U.S. APPLICATION NO. (U.S. Patent 37 CFR 1.29)

107049590

INTERNATIONAL APPLICATION NO.

PCT/EP99/06660

ATTORNEY'S DOCKET NUMBER

4925-210PUS

17.[x]The following fees are submitted

Basic National Fee (37 CFR 1.492(a)(1)-(5)):

Search Report has been prepared by the LPO or IPO	\$890.00
International preliminary examination fee paid to USPTO (37 CFR 1.482)	\$710.00
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2))	\$740.00
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO	\$1040.00
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4)	\$100.00

ENTER APPROPRIATE BASIC FEE AMOUNT = \$ 890

Surcharge of \$130.00 for furnishing the oath or declaration later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).

\$

Claims	Number Filed	Number Extra	Rate		
Total Claims	38 - 20 =	18	x \$18.00	\$	324
Independent Claims	4 - 3 =	1	x \$84.00	\$	84
Multiple dependent claim(s) (if applicable)			+ \$280.00	\$	
TOTAL OF ABOVE CALCULATIONS =				\$	1298
Reduction of 1/2 for filing by small entity, if applicable.				\$	
SUBTOTAL =				\$	1298
Processing fee of \$130.00 for furnishing the English translation later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(f))				\$	
TOTAL NATIONAL FEE =				\$	1298
Fee for recording the enclosed assignment (37 CFR 1.21(h)) The assignment must be accompanied by the appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property				\$	
TOTAL FEES ENCLOSED				\$	1298
Amount to be refunded:				\$	
charged:				\$	

a. [x]One check in the amount of \$ 1298 to cover the above fee is enclosed

b. [ ] Please charge my Deposit Account No. 03-2412 in the amount of \$ to cover the above fees. A duplicate copy of this sheet is enclosed

c. [x]The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 03-2412. A duplicate copy of this sheet is enclosed

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO  
Michael C. Stuart  
Cohen, Pontani, Lieberman & Pavane  
551 Fifth Avenue, Suite 1210  
New York, New York 10176

*Michael C. Stuart*  
Michael C. Stuart  
Registration Number 35 698 February 13, 2002  
Tel. (212) 687-2770

By Express Mail # EV052763666US · February 13, 2002

Attorney Docket # 4925-210PUS

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

---

In re National Phase PCT Application of

Sami USKELA et al.

International Appln. No.: PCT/EP99/06660

International Filing Date: 09 September 1999

For: In Controlled Multicast

---

**PRELIMINARY AMENDMENT**

Assistant Commissioner for Patents  
Washington, D.C. 20231  
**BOX PCT**

S I R:

Prior to examination of the above-identified application, amend the application as follows:

**IN THE SPECIFICATION:**

Page 4, delete lines 11 to 16, and insert therefor the following,beginning as a new paragraph:

--Other objects and features of the present invention will become apparent from the following detailed description considered in conjunction with the accompanying drawings. It is to be understood, however, that the drawings are intended solely for purposes of illustration and not as a definition of the limits of the invention, for which reference should be made to the appended claims.--.

Page 11, delete lines 18 to 24, and insert therefor the following,beginning as a new paragraph:

By Express Mail # EV052763666US · February 13, 2002

--Thus, while there have been shown and described and pointed out fundamental novel features of the present invention as applied to a preferred embodiment thereof, it will be understood that various omissions and substitutions and changes in the form and details of the devices described and illustrated, and in their operation, and of the methods described may be made by those skilled in the art without departing from the spirit of the present invention. For example, it is expressly intended that all combinations of those elements and/or method steps which perform substantially the same function in substantially the same way to achieve the same results are within the scope of the invention. Substitutions of elements from one described embodiment to another are also fully intended and contemplated. It is the intention, therefore, to be limited only as indicated by the scope of the claims appended hereto.--.

Page 12, line 1, delete "CLAIMS" and insert therefor --What is claimed is:--.

IN THE CLAIMS:

Amend claims 4, 5, 14 18, 19 and 29 to read as follows:

4. The method according to claim 2, wherein the certain content is filtered out in the filtering step (S24).

5. The method according to claim 2, wherein the receiver-specific parameters are dependent on receiver conditions.

14. The method according to claim 8, wherein the receiver-specific parameters are dependent on receiver conditions.

18. The apparatus according to claim 16, wherein the certain content is filtered out by the routing means (2).

By Express Mail # EV052763666US · February 13, 2002

19. The apparatus according to claim 16, wherein the receiver-specific parameters are dependent on receiver conditions.

29. The apparatus according to claim 23, wherein the receiver-specific parameters are dependent on receiver conditions.

Add the following new claims:

31. The method according to claim 3, wherein the certain content is filtered out in the filtering step (S24).

32. The method according to claim 3, wherein the receiver-specific parameters are dependent on receiver conditions.

33. The method according to claim 10, wherein the receiver-specific parameters are dependent on receiver conditions.

34. The method according to claim 11, wherein the receiver-specific parameters are dependent on receiver conditions.

35. The apparatus according to claim 17, wherein the certain content is filtered out by the routing means (2).

36. The apparatus according to claim 17, wherein the receiver-specific parameters are dependent on receiver conditions.



By Express Mail # EV052763666US · February 13, 2002

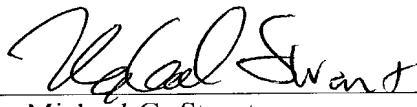
**REMARKS**

This preliminary amendment is presented to place the application in proper form for examination and to eliminate multiple dependency from the present claims. No new matter has been added. Early examination and favorable consideration of the above-identified application is earnestly solicited.

Attached hereto is a mark-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version with markings to show changes made**".

Any additional fees or charges required at this time in connection with the application may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,  
COHEN, PONTANI, LIEBERMAN & PAVANE

By:   
Michael C. Stuart  
Reg. No. 35,698  
551 Fifth Avenue, Suite 1210  
New York, N.Y. 10176  
(212) 687-2770

13 February 2002

By Express Mail # 15 ~ February 13, 2002

**AMENDMENTS TO THE SPECIFICATION AND CLAIMS SHOWING CHANGES**

In the Claims:

4. The method according to claim 2 **[or 3]**, wherein the certain content is filtered out in the filtering step (S24).

5. The method according to claim 2 **[or 3]**, wherein the receiver-specific parameters are dependent on receiver conditions.

14. The method according to **claim 8** **[any one of the claims 8, 10 and 11]**, wherein the receiver-specific parameters are dependent on receiver conditions.

18. The apparatus according to claim 16 **[or 17]**, wherein the certain content is filtered out by the routing means (2).

19. The apparatus according to claim 16 **[or 17]**, wherein the receiver-specific parameters are dependent on receiver conditions.

29. The apparatus according to **claim 23** **[any one of claims 23, 25 and 26]**, wherein the receiver-specific parameters are dependent on receiver conditions.



Rec'd PCT/PTO

06 JUN 2002

10049500 . 06/06/02  
Attorney Docket # 4925-210PUS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re National Phase PCT Application of

Sami USKELA et al.

International Appln. No.: PCT/EP99/06660

International Filing Date: September 09, 1999

For: In Controlled Multicast

SECOND PRELIMINARY AMENDMENT

Assistant Commissioner for Patents

Washington, D.C. 20231

BOX PCT

S I R:

Prior to examination of the above-identified application please amend the application as follows:

In the Specification:

Page 1, before line 5, the title ("FIELD OF THE INVENTION"), added by the Preliminary Amendment filed with the application, insert the following title and paragraph:

-- PRIORITY CLAIM

This is a U.S. national stage of PCT application No. PCT/EP99/06660, filed on September 9, 1999. Priority is claimed on that application.--

By Express Mail # EV114635409US June 6, 2002


**REMARKS**

This preliminary amendment is presented to perfect the claim of priority. No new matter has been added. Early examination and favorable consideration of the above-identified application is earnestly solicited.

Any additional fees or charges required at this time in connection with the application may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,  
COHEN, PONTANI, LIEBERMAN & PAVANE

By:



Michael C. Stuart  
Reg. No. 35,698  
551 Fifth Avenue, Suite 1210  
New York, N.Y. 10176  
(212) 687-2770

6 June 2002

- 1 -

TITLE OF THE INVENTION

IN controlled multicast.

5 FIELD OF THE INVENTION

The present invention relates to multicast address mapping in a packet-switched network, and in particular to a method and an apparatus in a packet-switched network for supplying data  
10 packets to receivers belonging to a multicast group.

BACKGROUND OF THE INVENTION

Multicast is a point to multipoint service in a network where  
15 different subscribers have to subscribe to a multicast group. Multicast technique generally is used by applications that want to reach a group of like-minded receivers who normally are not known by the sender in advance.

20 Multicast technique is well suitable for radio or TV broadcasting. Transmission of sound or image will become popular also in a wireless network in future when the UMTS (Universal Mobile Telecommunications System) technology will provide needed capacity. A multicast address identifies a  
25 group of interfaces or subscribers. Data packets that are sent to a multicast address are supplied to all of the interfaces or subscribers of the group by means of the Internet Group Management Protocol (IGMP).

30 However, according to conventional multicast technique it is not possible to consider different needs of different subscribers belonging to a multicast group.

SUMMARY OF THE INVENTION

- 2 -

It is therefore an object of the present invention to solve the above-mentioned problem and to enable different manipulation of multicast data packets for different receivers belonging to a multicast group.

5

According to a first aspect of the present invention this object is achieved by a method in a packet-switched network for supplying data packets to receivers belonging to a multicast group, comprising the steps of:

- ```

10     receiving data packets from a sender;
        buffering data packets the destination address of which
is a multicast address of a multicast group;
        determining the addresses of the receivers of the
multicast group indicated by the multicast address and
15 determining receiver-specific parameters;
        filtering the multicast data packets in accordance with
the receiver-specific parameters for each receiver of the
multicast group; and
        supplying the filtered multicast data packets to the
20 determined receiver addresses.

```

Furthermore, according to the first aspect, the object is achieved by an apparatus in a packet-switched network for supplying data packets to receivers belonging to a multicast group, comprising:

- a routing means for receiving data packets from a sender and for buffering data packets the destination address of which is a multicast address of a multicast group; and
- a control means communicating with the routing means for  
30 determining the addresses of the receivers of the multicast group indicated by the multicast address and receiver-specific parameters, for designating filters for each receiver in accordance with the receiver-specific parameters and for supplying the determined addresses and designated  
35 filters to the routing means;

- 3 -

wherein the routing means filters the multicast data packets with the designated filters for each receiver of the multicast group and supplies the filtered multicast data packets to the determined receiver addresses.

5

According to a second aspect of the present invention, the above-mentioned object is achieved by a method in a packet-switched network for supplying data packets to receivers belonging to a multicast group, comprising the steps of:

- 10 receiving data packets from a sender;
- buffering data packets the destination address of which is a multicast address of a multicast group;
- determining the addresses of the receivers of the multicast group indicated by the multicast address and
- 15 determining receiver-specific parameters;
- filtering the determined addresses in accordance with the receiver-specific parameters; and
- supplying the multicast data packets to the filtered receiver addresses.

20

Furthermore, according to the second aspect, the object is achieved by an apparatus in a packet-switched network for supplying data packets to receivers belonging to a multicast group, comprising:

- 25 a routing means for receiving data packets from a sender and for buffering data packets the destination address of which is a multicast address of a multicast group; and
  - a control means communicating with the routing means for determining the addresses of the receivers of the multicast
  - 30 group indicated by the multicast address and receiver-specific parameters, for designating filters for each determined receiver address in accordance with the receiver-specific parameters and for supplying the determined addresses and designated filters to the routing means;
  - 35 wherein the routing means filters the determined
- 
- addresses with the designated filters for each receiver of

- 4 -

the multicast group and supplies the multicast data packets to the filtered receiver addresses.

With the IN controlled multicast addressing to subscribers of a multicast group according to the present invention subscriber-specific restrictions or exceptions can be set. For example, multicast data packets can be allowed to be sent to a receiver according to a time schedule. Also a content of data packets can be matched to the capability of a receiver.

Further features of the present invention are defined in the dependent claims.

In the following the present invention will be described by way of preferred embodiments thereof with reference to the accompanying drawings.

### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows a schematic block diagram of the basic components of a system according to the present invention;

Fig. 2 shows a flowchart of an operation of a routing means and a control means of Fig. 1 according to a first embodiment of the present invention; and

Fig. 3 shows a flowchart of an operation of the routing means and control means of Fig. 1 according to a second embodiment of the present invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The idea of the present invention is to provide Intelligent Network (IN) control for the multicast service.

- 5 -

Fig. 1 shows a schematic block diagram of the system according to the present invention. For purpose of simplification merely the basic components of the system are shown in the diagram.

5

A sender 1 sends data packets to a routing means 2 in a packet-switched network. For example, the routing means 2 can be an Internet router or a proxy server. In case the sender 1 sends data packets to a multicast address indicating a  
10 multicast group the routing means 2 has to route the data packets to the members of the multicast group, for example to receivers 4a to 4c. A receiver belonging to a multicast group may be a UMTS subscriber in a GSM (Global System for Mobile communications) network.

15

However, each receiver 4a-c may have specific needs with respect to data communications. Thus, according to the present invention, a control means 3 such as an SCP (Service Control Point) is provided for the routing means 2. The  
20 control means 3 stores tables of addresses of receivers belonging to multicast groups and specific filtering parameter of these receivers in a table in advance. The parameters can be references to predefined filtering algorithms, address of an external filter device or specific  
25 filtering rules. The predefined algorithms can include image filtering, advertisement filtering, etc.

When the routing means 2 receives data packets which destination address is a multicast address addressing the  
30 receivers 4a-c it buffers these multicast data packets and communicates the multicast address to the control means 3 in order to fetch the address list of the receivers belonging to the detected multicast group. Moreover, the routing means 2 is able to check the data packets on certain contents or data  
35 amount and communicate the results to the control means 3.

- 6 -

The control means 3 determines the addresses of the receivers belonging to the multicast group indicated by the multicast address by using the stored tables, i.e. the control means 3  
5 prepares the receiver list for the multicast address. For example, the control means 3 determines the addresses of the receivers 4a-c which belong to the same multicast group. Then the control means determines specific parameters of each receiver 4a-c by searching the stored table in which the  
10 specific parameters for the receivers of this multicast group are defined, i.e. the control means 3 checks filtering parameters for each receiver of the prepared receiver list. On the basis of the determined receiver-specific filtering parameters and taking into account the checking results  
15 communicated by the routing means 2, the control means 3 designates a filter or filtering rules for each receiver 4a-c and communicates the list of receiver addresses and the filtering rules per address to the routing means 2. According to SCP implementation, service logic programs in the SCP  
20 effect this operation.

The routing means 2 filters the data packets for each of the receivers 4a-c according to the designated filter for each receiver 4a-c and transmits the packets to the receivers 4a-c  
25 if the packets pass the filter. In this way the data packets can be modified for each receiver 4a-c according to its needs defined in the receiver-specific parameters. This filtering function may be integrated in the routing means or, alternatively, in a separated device, e.g. in a proxy.

30

It is also possible to filter the addresses of the receivers belonging to a multicast group. The control means 3 can designate filters for the receiver addresses so that the routing means does not route any data packets to receivers  
35 which addresses are filtered out.



- 7 -

The receiver-specific filtering parameters may be dependent on receiver conditions or capabilities, including for example reachability of the receiver, available bandwidth, type of terminal screen such as big/small, color/monochromatic, graphical/text and the like.

In the following a first embodiment of the present invention will be described with reference to Fig. 2. According to the first embodiment of supplying multicast data packets, these packets can be modified by means of filters designated by the control means 3 for each receiver 4a-c.

In a first step S21 data packets are received by the routing means 2 from the sender 1. In case the data packets are sent to a multicast address by the sender the multicast data packets are buffered in the routing means 2 in step S22. Then the addresses of the receivers 4a-c of the multicast group indicated by the multicast address are determined in step S23. Furthermore, in step S23, the receiver-specific parameters are determined. As described before, the determination is carried out by the control means 3 providing the list of receiver addresses which may include the receiver-specific filtering parameters to the routing means 2.

In step S24 the multicast data packets are filtered in accordance with the determined receiver-specific parameters for each receiver 4a-c of the multicast group. That is, filters are designated for each receiver 4a-c on the basis of the receiver-specific parameters and the data packets are modified using the filters. Finally, the modified or filtered multicast data packets are supplied to the respective receivers 4a-c.

- 8 -

The receiver-specific parameters can indicate a certain content of data packets that is not to be received by a specific receiver or a data amount of a certain content of data packets which data amount is not to be received by a specific receiver. For example, a multicast receiver 4a that is roaming in a GSM network may have not enough capacity to handle images. Thus, it has indicated in its parameters that it does not want to receive any images. When the control means 3 determines the address of the receiver 4a and its parameters in step S23 it designates a filter for filtering out image data from the multicast data packets and supplies this filter information to the routing means 2. The routing means 2 filters the data packets for the receiver 4a so that no images are present in the filtered data packets and supplies the filtered packets to the receiver 4a.

In this context the receiver 4a can indicate in its parameters that it does not want to receive images only when it is roaming in the network. In this case the control means 3 checks the conditions of the receiver 4a and designates the filter accordingly. Moreover, certain time intervals can be indicated in the receiver-specific parameters in which time intervals certain contents are not to be received by the receiver.

25

In the following, a second embodiment of the present invention will be described with reference to Fig. 3. According to the second embodiment of supplying multicast data packets, addresses of receivers belonging to a multicast group can be filtered out so that specific receivers do not receive any multicast data packets.

In step S31 data packets are received by the routing means 2 from the sender 1. In case the data packets are sent to a multicast address they are buffered in the routing means 2 in step S32. In step S33 the receiver addresses and receiver-



35

- 11 -

receivers belonging to a multicast group are disclosed. The apparatus comprises a routing means for receiving data packets from a sender and for buffering data packets the destination address of which is a multicast address of a  
5 multicast group. The apparatus further comprises a control means communicating with the routing means for determining the addresses of the receivers of the multicast group indicated by the multicast address and receiver-specific parameters, for designating filters for each receiver and/or  
10 each determined receiver address in accordance with the receiver-specific parameters and for supplying the determined addresses and designated filters to the routing means. The routing means filters the multicast data packets and/or the determined addresses with the designated filters for each  
15 receiver of the multicast group and supplies the filtered multicast data packets to the filtered receiver addresses.

While the invention has been described with reference to preferred embodiments, the description is illustrative of the invention and is not to be construed as limiting the invention. Various modifications and applications may occur to those skilled in the art without departing from the true spirit and scope of the invention as defined by the appended claims.

- 12 -

CLAIMS:

1. A method in a packet-switched network for supplying data packets to receivers (4a-c) belonging to a multicast group, comprising the steps of:
- receiving (S21) data packets from a sender (1);
  - buffering (S22) data packets the destination address of which is a multicast address of a multicast group;
  - determining (S23) the addresses of the receivers (4a-c) of the multicast group indicated by the multicast address and determining receiver-specific parameters;
  - filtering (S24) the multicast data packets in accordance with the receiver-specific parameters for each receiver (4a-c) of the multicast group; and
  - supplying (S25) the filtered multicast data packets to the determined receiver addresses.
2. The method according to claim 1, wherein the receiver-specific parameters indicate a certain content of data packets that is not to be received by the specific receiver.
3. The method according to claim 1, wherein the receiver-specific parameters indicate a data amount of a certain content in data packets which data amount is not to be received by the specific receiver.
4. The method according to claim 2 or 3, wherein the certain content is filtered out in the filtering step (S24).
5. The method according to claim 2 or 3, wherein the receiver-specific parameters are dependent on receiver conditions.
6. A method in a packet-switched network for supplying data packets to receivers (4a-c) belonging to a multicast group, comprising the steps of:

- 13 -

```

    receiving (S31) data packets from a sender (1);
    buffering (S32) data packets the destination address of
which is a multicast address of a multicast group;

```

determining (S33) the addresses of the receivers (4a-c)  
5 of the multicast group indicated by the multicast address and  
determining receiver-specific parameters;  
filtering (S34) the determined addresses in accordance  
with the receiver-specific parameters; and  
supplying (S35) the multicast data packets to the  
10 filtered receiver addresses.

7. The method according to claim 6, wherein the determining step (S33) includes the further step of:

detecting contents and a data amount of data packets,  
15 and wherein the filtering step (S34) includes the further  
step of:

filtering the determined addresses in accordance with the detected results.

20 8. The method according to claim 6, wherein the receiver-specific parameters indicate a certain time at which no data packets are to be received by the specific receiver.

9. The method according to claim 8, wherein when the certain  
25 time is detected in the determining step (S33) the address of  
the specific receiver is filtered out in the filtering step  
(S35).

10. The method according to claim 7, wherein the receiver-specific parameters indicate a certain content of data packets that is not to be received by the specific receiver.

11. The method according to claim 7, wherein the receiver-specific parameters indicate a certain data amount of data  
35 packets which is not to be received by the specific receiver.

- 14 -

12. The method according to claim 10, wherein when the certain content is detected in the detecting step the address of the specific receiver is filtered out in the filtering step (S35).

5

13. The method according to claim 11, wherein when the certain data amount is detected in the detecting step the address of the specific receiver is filtered out in the filtering step (S35).

10

14. The method according to any one of claims 8, 10 and 11, wherein the receiver-specific parameters are dependent on receiver conditions.

15 15. An apparatus in a packet-switched network for supplying data packets to receivers (4a-c) belonging to a multicast group, comprising:

a routing means (2) for receiving data packets from a sender (1) and for buffering data packets the destination address of which is a multicast address of a multicast group; and

20

a control means (3) communicating with the routing means (2) for determining the addresses of the receivers (4a-c) of the multicast group indicated by the multicast address and receiver-specific parameters, for designating filters for each receiver (4a-c) in accordance with the receiver-specific parameters and for supplying the determined addresses and designated filters to the routing means (2);

25

wherein the routing means (2) filters the multicast data packets with the designated filters for each receiver (4a-c) of the multicast group and supplies the filtered multicast data packets to the determined receiver addresses.

30

16. The apparatus according to claim 15, wherein the receiver-specific parameters indicate a certain content of

35



- 15 -

data packets that is not to be received by the specific receiver.

17. The apparatus according to claim 15, wherein the receiver-specific parameters indicate a data amount of a certain content in data packets which data amount is not to be received by the specific receiver.

18. The apparatus according to claim 16 or 17, wherein the certain content is filtered out by the routing means (2).

19. The apparatus according to claim 16 or 17, wherein the receiver-specific parameters are dependent on receiver conditions.

20. The apparatus according to claim 15, wherein the control means (3) determines the receiver addresses and receiver-specific parameters by means of tables stored in the control means.

21. An apparatus in a packet-switched network for supplying data packets to receivers (4a-c) belonging to a multicast group, comprising:

a routing means (2) for receiving data packets from a sender (1) and for buffering data packets the destination address of which is a multicast address of a multicast group; and

a control means (3) communicating with the routing means (2) for determining the addresses of the receivers (4a-c) of the multicast group indicated by the multicast address and receiver-specific parameters, for designating filters for each determined receiver address in accordance with the receiver-specific parameters and for supplying the determined addresses and designated filters to the routing means (2);

wherein the routing means (2) filters the determined addresses with the designated filters for each receiver (4a-

- 16 -

c) of the multicast group and supplies the multicast data packets to the filtered receiver addresses.

22. The apparatus according to claim 21, wherein the routing  
5 means (2) detects contents and a data amount of data packets and communicates the results to the control means (3) which designates the filters also in accordance with these results.

23. The apparatus according to claim 21, wherein the  
10 receiver-specific parameters indicate a certain time at which no data packets are to be received by the specific receiver.

24. The apparatus according to claim 23, wherein when the  
certain time is detected by the control means (3) the address  
15 of the specific receiver is filtered out by the routing means (2).

25. The apparatus according to claim 22, wherein the  
receiver-specific parameters indicate a certain content of  
20 data packets that is not to be received by the specific receiver.

26. The apparatus according to claim 22, wherein the  
receiver-specific parameters indicate a certain data amount  
25 of data packets which is not to be received by the specific receiver.

27. The apparatus according to claim 25, wherein when the  
certain content is detected by the routing means (2) the  
30 address of the specific receiver is filtered out by the routing means (2).

28. The apparatus according to claim 26, wherein when the  
certain data amount is detected by the routing means (2) the  
35 address of the specific receiver is filtered out by the routing means (2).

- 17 -

29. The apparatus according to any one of claims 23, 25 and 26, wherein the receiver-specific parameters are dependent on receiver conditions.

5

30. The apparatus according to claim 21, wherein the control means (3) determine the receiver addresses and receiver-specific parameters by means of tables stored in the control means.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
15 March 2001 (15.03.2001)

PCT

(10) International Publication Number  
**WO 01/19029 A1**

(51) International Patent Classification<sup>7</sup>: H04L 12/18

(74) Agents: PELLMANN, Hans-Bernd et al.; Tiedtke-Bühling-Kinne, Bavariaring 4, D-80336 Munich (DE).

(21) International Application Number: PCT/EP99/06660

(22) International Filing Date:  
9 September 1999 (09.09.1999)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant (for all designated States except US): NOKIA NETWORKS OY [FI/FI]; Keilalahdentie 4, FIN-02150 Espoo (FI).

(81) Designated States (national): AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW.

(72) Inventors: and

(75) Inventors/Applicants (for US only): USKELA, Sami [FI/FI]; Nokia Networks Oy, Keilalahdentie 4, FIN-02150 Espoo (FI). RAUTIAINEN, Aapo [FI/FI]; Nokia Networks Oy, Keilalahdentie 4, FIN-02150 Espoo (FI). LEPPÄNEN, Eva-Maria [FI/FI]; Nokia Networks Oy, Keilalahdentie 4, FIN-02150 Espoo (FI). TUDOSE, Lucia [FI/FI]; Nokia Networks Oy, Keilalahdentie 4, FIN-02150 Espoo (FI). NIEMINEN, Mari, K. [FI/FI]; Nokia Networks Oy, Keilalahdentie 4, FIN-02150 Espoo (FI).

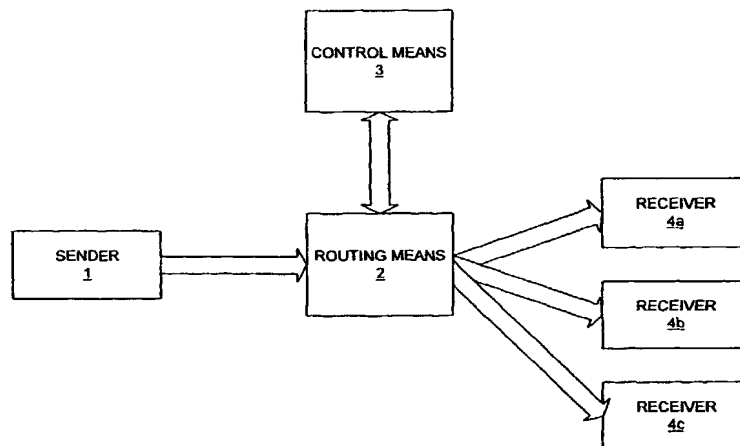
(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

— With international search report.

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: IN CONTROLLED MULTICAST



(57) Abstract: According to the present invention a method and an apparatus in a packet-switched network for supplying data packets to receivers (4a-c) belonging to a multicast group are disclosed. The apparatus comprises a routing means (2) for receiving data packets from a sender (1) and for buffering data packets the destination address of which is a multicast address of a multicast group. The apparatus further comprises a control means (3) communicating with the routing means (2) for determining the addresses of the receivers (4a-c) of the multicast group indicated by the multicast address and receiver-specific parameters, for designating filters for each receiver (4a-c) and/or each determined receiver address in accordance with the receiver-specific parameters and for supplying the determined addresses and designated filters to the routing means (2). The routing means (2) filters the multicast data packets and/or the determined addresses with the designated filters for each receiver (4a-c) of the multicast group and supplies the filtered multicast data packets to the filtered receiver addresses.

WO 01/19029 A1

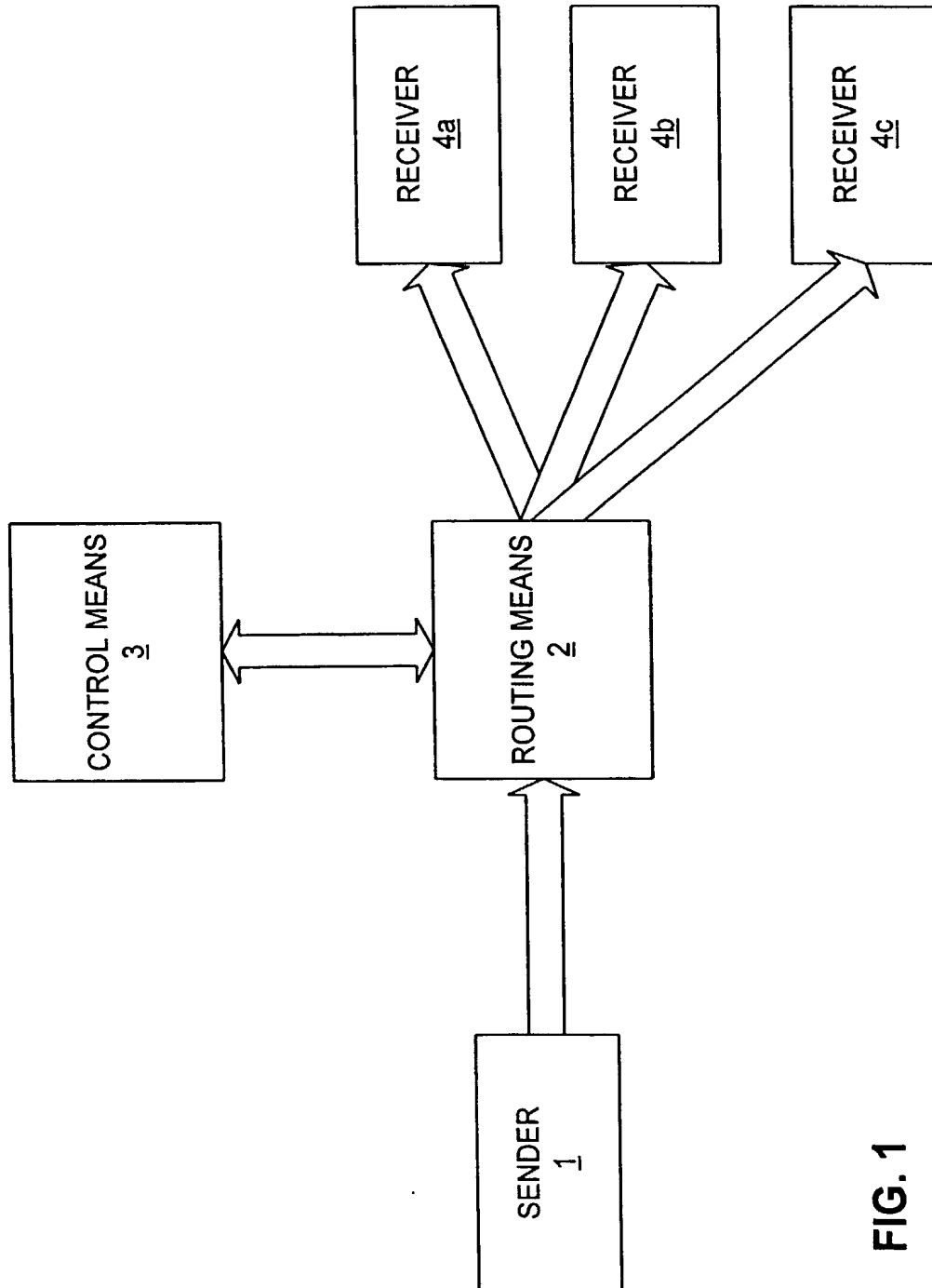


FIG. 1

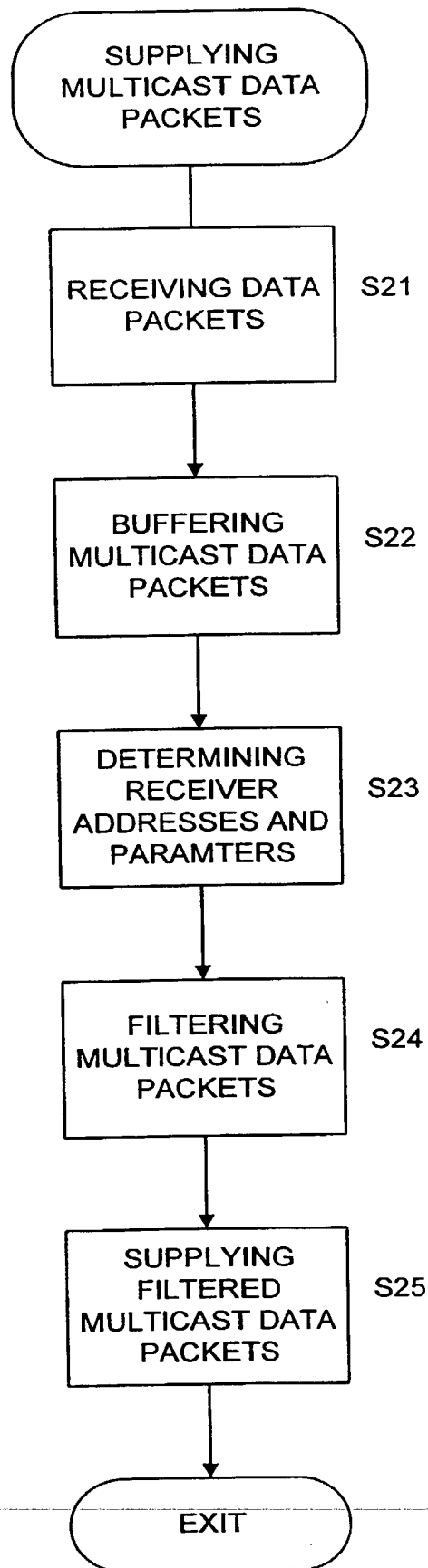


FIG. 2

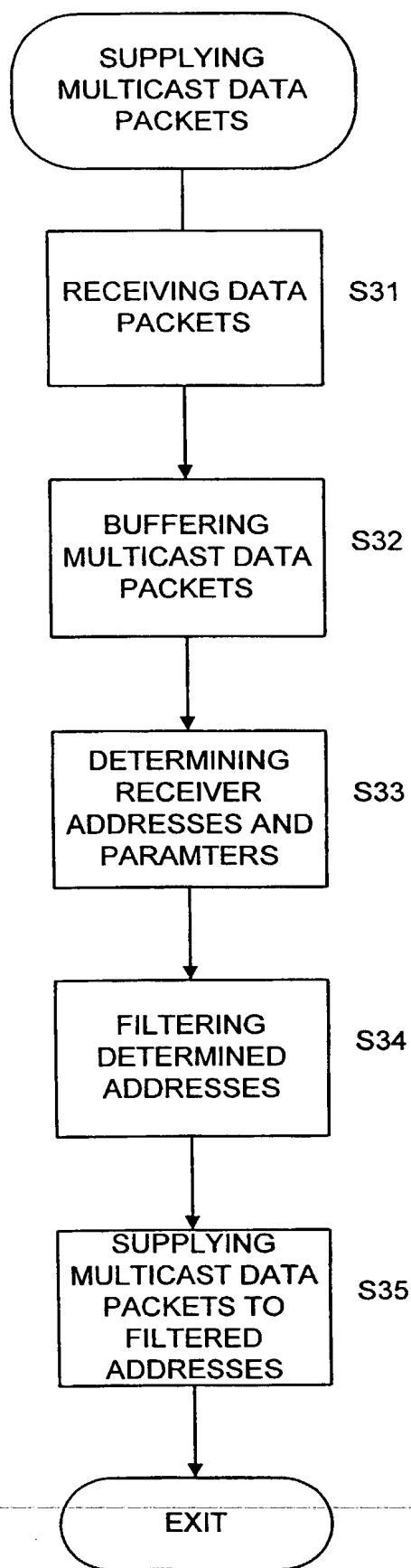



FIG. 3

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |                                      |                                             |                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------------------|---------------------------------------------|-----------------------------|
| <b>COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY</b><br>Includes Reference to PCT International Applications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                                      | Attorney's Docket No.<br><b>4925-210PUS</b> |                             |
| <p>As a below named inventor, I hereby declare that:</p> <p>My residence, post office address and citizenship are as stated below next to my name.</p> <p>I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:</p> <p style="text-align: center;"><b>IN CONTROLLED MULTICAST</b></p> <p>the specification of which (check only one item below)</p> <p style="margin-left: 40px;"> <input type="checkbox"/> is attached hereto<br/> <input type="checkbox"/> was filed as United States application<br/>           Serial No. _____<br/>           on _____<br/>           and was amended<br/>           on _____ (if applicable).<br/> <input checked="" type="checkbox"/> was filed as PCT international application<br/>           Number <u>PCT/EP99/06660</u><br/>           on <u>09 September 1999</u><br/>           and was amended under PCT Article 19<br/>           on _____ (if applicable).         </p> <p>I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.</p> <p>I acknowledge the duty to disclose information which is material to the patentability of the application in accordance with Title 37, Code of Federal Regulations, §1.56(a).</p> <p>I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.</p> |                       |                                      |                                             |                             |
| <b>PRIOR FOREIGN/PCT APPLICATIONS AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |                                      |                                             |                             |
| Country<br>(if PCT, indicate "PCT")                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Application<br>Number | Date of Filing<br>(day, month, year) | Priority Claimed<br>Under 35 U.S.C. 119     |                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |                                      | <input type="checkbox"/> YES                | <input type="checkbox"/> NO |
| PCT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | PCT/EP99/06660        | 09 September 1999                    | <input checked="" type="checkbox"/> YES     | <input type="checkbox"/> NO |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |                                      | <input type="checkbox"/> YES                | <input type="checkbox"/> NO |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |                                      | <input type="checkbox"/> YES                | <input type="checkbox"/> NO |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |                                      | <input type="checkbox"/> YES                | <input type="checkbox"/> NO |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |                                      | <input type="checkbox"/> YES                | <input type="checkbox"/> NO |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |                                      | <input type="checkbox"/> YES                | <input type="checkbox"/> NO |

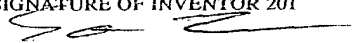


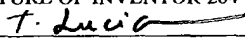



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                                                |                                                                                                                                                 |                                                      |                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>Combined Declaration for Patent Application and Power of Attorney (Continued)</b><br>(Includes Reference to PCT International Applications)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                        |                                                |                                                                                                                                                 | Attorney's Docket No.<br><b>4925-210PUS</b>          |                                                                                                  |
| I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:                                                                                                                                                                                                                                           |                        |                                                |                                                                                                                                                 |                                                      |                                                                                                  |
| PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                                                |                                                                                                                                                 |                                                      |                                                                                                  |
| U.S. APPLICATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                        |                                                | STATUS (check one)                                                                                                                              |                                                      |                                                                                                  |
| U S APPLICATION NUMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | U.S. FILING DATE       | PATENTED                                       | PENDING                                                                                                                                         | ABANDONED                                            |                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                                                |                                                                                                                                                 |                                                      |                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                                                |                                                                                                                                                 |                                                      |                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                                                |                                                                                                                                                 |                                                      |                                                                                                  |
| PCT APPLICATIONS DESIGNATING THE U.S.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                        |                                                |                                                                                                                                                 |                                                      |                                                                                                  |
| PCT APPLICATION NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | PCT FILING DATE        | U S. SERIAL NUMBERS ASSIGNED (if any)          |                                                                                                                                                 |                                                      |                                                                                                  |
| PCT/EP99/06660                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 09 September 1999      |                                                | x                                                                                                                                               |                                                      |                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                                                |                                                                                                                                                 |                                                      |                                                                                                  |
| <b>POWER OF ATTORNEY:</b> As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith ( <i>List name and registration number</i> )<br>MYRON COHEN, Reg. No. 17,358; THOMAS C. PONTANI, Reg. No. 29,763; LANCE J. LIEBERMAN, Reg. No. 28,437; MARTIN B. PAVANE, Reg. No. 28,337; MICHAEL C. STUART, Reg. No. 35,698; KLAUS P. STOFFEL, Reg. No. 31,668; EDWARD WEISZ, Reg. No. 37,257; VINCENT M. FAZZARI, Reg. No. 26,879; JULIA S. KIM, Reg. No. 36,567; ALFRED FROEBRICH, Reg. No. 38,887; ALFRED H. HEMINGWAY, JR., Reg. No. 26,736; KENT H. CHENG, Reg. No. 33,849; YUNLING REN, Reg. No. 47,019; ROGER S. THOMPSON, Reg. No. 29,594; BRICE FALLER, Reg. No. 29,532; DAVID J. ROSENBLUM, Reg. No. 37,709; TONY CHEN, Reg. No. 44,607; ELI WEISS, Reg. No. 17,765; TEODOR J. HOLMBERG, Reg. No. 50,140. |                        |                                                |                                                                                                                                                 |                                                      |                                                                                                  |
| Send correspondence to:<br>Michael C. Stuart<br>Reg. 35,698<br>Cohen, Pontani, Lieberman & Pavane<br>551 Fifth Avenue, Suite 1210<br>New York, New York 10176                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                        |                                                | <br><b>27799</b><br><small>PATENT, TRADEMARK OFFICE</small> |                                                      | Direct Telephone calls to:<br>(name and telephone number)<br>Michael C. Stuart<br>(212) 687-2770 |
| 201                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | FULL NAME OF INVENTOR  | FAMILY NAME<br><b>USKELA</b>                   | FIRST GIVEN NAME<br><b>Sami</b>                                                                                                                 | SECOND GIVEN NAME                                    |                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | RESIDENCE, CITIZENSHIP | CITY<br><b>Espoo</b>                           | STATE OR FOREIGN COUNTRY<br><b>Finland</b> <i>FIX</i>                                                                                           | COUNTRY OF CITIZENSHIP<br><b>Finland</b>             |                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | POST OFFICE ADDRESS    | POST OFFICE ADDRESS<br><b>Keilalahdentie 4</b> | CITY<br><b>Espoo</b>                                                                                                                            | STATE & ZIP CODE/COUNTRY<br><b>FIN-02150 Finland</b> |                                                                                                  |
| 202                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | FULL NAME OF INVENTOR  | FAMILY NAME<br><b>RAUTIAINEN</b>               | FIRST GIVEN NAME<br><b>Aapo</b>                                                                                                                 | SECOND GIVEN NAME                                    |                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | RESIDENCE, CITIZENSHIP | CITY<br><b>Espoo</b>                           | STATE OR FOREIGN COUNTRY<br><b>Finland</b> <i>FIX</i>                                                                                           | COUNTRY OF CITIZENSHIP<br><b>Finland</b>             |                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | POST OFFICE ADDRESS    | POST OFFICE ADDRESS<br><b>Keilalahdentie 4</b> | CITY<br><b>Espoo</b>                                                                                                                            | STATE & ZIP CODE/COUNTRY<br><b>FIN-02150 Finland</b> |                                                                                                  |

| Combined Declaration for Patent Application and Power of Attorney (Continued)<br>(Includes Reference to PCT International Applications) |                        |                     |                          | Attorney's Docket No.<br>4925-210PUS |
|-----------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------|--------------------------|--------------------------------------|
| 203                                                                                                                                     | FULL NAME OF INVENTOR  | FAMILY NAME         | FIRST GIVEN NAME         | SECOND GIVEN NAME                    |
|                                                                                                                                         | RESIDENCE, CITIZENSHIP | CITY                | STATE OR FOREIGN COUNTRY | COUNTRY OF CITIZENSHIP               |
|                                                                                                                                         | POST OFFICE ADDRESS    | POST OFFICE ADDRESS | CITY                     | STATE & ZIP CODE/COUNTRY             |
|                                                                                                                                         |                        | LEPPÄNEN            | Eva-Maria                |                                      |
|                                                                                                                                         |                        | Espoo               | Finland                  | Finland                              |
|                                                                                                                                         |                        | Keilalahdentie 4    | Espoo                    | FIN-02150 Finland                    |
| 204                                                                                                                                     | FULL NAME OF INVENTOR  | FAMILY NAME         | FIRST GIVEN NAME         | SECOND GIVEN NAME                    |
|                                                                                                                                         | RESIDENCE, CITIZENSHIP | CITY                | STATE OR FOREIGN COUNTRY | COUNTRY OF CITIZENSHIP               |
|                                                                                                                                         | POST OFFICE ADDRESS    | POST OFFICE ADDRESS | CITY                     | STATE & ZIP CODE/COUNTRY             |
|                                                                                                                                         |                        | TUDOSE              | Lucia                    | Finland                              |
|                                                                                                                                         |                        | Espoo               | Finland                  | Finland                              |
|                                                                                                                                         |                        | Keilalahdentie 4    | Espoo                    | FIN-02150 Finland                    |
| 205                                                                                                                                     | FULL NAME OF INVENTOR  | FAMILY NAME         | FIRST GIVEN NAME         | SECOND GIVEN NAME                    |
|                                                                                                                                         | RESIDENCE, CITIZENSHIP | CITY                | STATE OR FOREIGN COUNTRY | COUNTRY OF CITIZENSHIP               |
|                                                                                                                                         | POST OFFICE ADDRESS    | POST OFFICE ADDRESS | CITY                     | STATE & ZIP CODE/COUNTRY             |
|                                                                                                                                         |                        | NIEMINEN            | Mari                     | K.                                   |
|                                                                                                                                         |                        | Espoo               | Finland                  | Finland                              |
|                                                                                                                                         |                        | Keilalahdentie 4    | Espoo                    | FIN-02150 Finland                    |
| 206                                                                                                                                     | FULL NAME OF INVENTOR  | FAMILY NAME         | FIRST GIVEN NAME         | SECOND GIVEN NAME                    |
|                                                                                                                                         | RESIDENCE, CITIZENSHIP | CITY                | STATE OR FOREIGN COUNTRY | COUNTRY OF CITIZENSHIP               |
|                                                                                                                                         | POST OFFICE ADDRESS    | POST OFFICE ADDRESS | CITY                     | STATE & ZIP CODE/COUNTRY             |
|                                                                                                                                         |                        |                     |                          |                                      |
|                                                                                                                                         |                        |                     |                          |                                      |
|                                                                                                                                         |                        |                     |                          |                                      |
| 207                                                                                                                                     | FULL NAME OF INVENTOR  | FAMILY NAME         | FIRST GIVEN NAME         | SECOND GIVEN NAME                    |
|                                                                                                                                         | RESIDENCE, CITIZENSHIP | CITY                | STATE OR FOREIGN COUNTRY | COUNTRY OF CITIZENSHIP               |
|                                                                                                                                         | POST OFFICE ADDRESS    | POST OFFICE ADDRESS | CITY                     | STATE & ZIP CODE/COUNTRY             |
|                                                                                                                                         |                        |                     |                          |                                      |
|                                                                                                                                         |                        |                     |                          |                                      |
|                                                                                                                                         |                        |                     |                          |                                      |
| 208                                                                                                                                     | FULL NAME OF INVENTOR  | FAMILY NAME         | FIRST GIVEN NAME         | SECOND GIVEN NAME                    |
|                                                                                                                                         | RESIDENCE, CITIZENSHIP | CITY                | STATE OR FOREIGN COUNTRY | COUNTRY OF CITIZENSHIP               |
|                                                                                                                                         | POST OFFICE ADDRESS    | POST OFFICE ADDRESS | CITY                     | STATE & ZIP CODE/COUNTRY             |
|                                                                                                                                         |                        |                     |                          |                                      |
|                                                                                                                                         |                        |                     |                          |                                      |
|                                                                                                                                         |                        |                     |                          |                                      |
| 209                                                                                                                                     | FULL NAME OF INVENTOR  | FAMILY NAME         | FIRST GIVEN NAME         | SECOND GIVEN NAME                    |
|                                                                                                                                         | RESIDENCE, CITIZENSHIP | CITY                | STATE OR FOREIGN COUNTRY | COUNTRY OF CITIZENSHIP               |
|                                                                                                                                         | POST OFFICE ADDRESS    | POST OFFICE ADDRESS | CITY                     | STATE & ZIP CODE/COUNTRY             |
|                                                                                                                                         |                        |                     |                          |                                      |
|                                                                                                                                         |                        |                     |                          |                                      |
|                                                                                                                                         |                        |                     |                          |                                      |

| Combined Declaration for Patent Application and Power of Attorney (Continued)<br>(Includes Reference to PCT International Applications) |                        |                     |                          | Attorney's Docket No.<br>4925-210PUS |
|-----------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------|--------------------------|--------------------------------------|
| 2<br>1<br>0                                                                                                                             | FULL NAME OF INVENTOR  | FAMILY NAME         | FIRST GIVEN NAME         | SECOND GIVEN NAME                    |
|                                                                                                                                         | RESIDENCE, CITIZENSHIP | CITY                | STATE OR FOREIGN COUNTRY | COUNTRY OF CITIZENSHIP               |
|                                                                                                                                         | POST OFFICE ADDRESS    | POST OFFICE ADDRESS | CITY                     | STATE & ZIP CODE/COUNTRY             |
| 2<br>1<br>1                                                                                                                             | FULL NAME OF INVENTOR  | FAMILY NAME         | FIRST GIVEN NAME         | SECOND GIVEN NAME                    |
|                                                                                                                                         | RESIDENCE, CITIZENSHIP | CITY                | STATE OR FOREIGN COUNTRY | COUNTRY OF CITIZENSHIP               |
|                                                                                                                                         | POST OFFICE ADDRESS    | POST OFFICE ADDRESS | CITY                     | STATE & ZIP CODE/COUNTRY             |
| 2<br>1<br>2                                                                                                                             | FULL NAME OF INVENTOR  | FAMILY NAME         | FIRST GIVEN NAME         | SECOND GIVEN NAME                    |
|                                                                                                                                         | RESIDENCE, CITIZENSHIP | CITY                | STATE OR FOREIGN COUNTRY | COUNTRY OF CITIZENSHIP               |
|                                                                                                                                         | POST OFFICE ADDRESS    | POST OFFICE ADDRESS | CITY                     | STATE & ZIP CODE/COUNTRY             |

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

|                                                                                                                  |                                                                                                                  |                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| SIGNATURE OF INVENTOR 201<br>  | SIGNATURE OF INVENTOR 202<br>  | SIGNATURE OF INVENTOR 203<br> |
| DATE<br>07/25/02                                                                                                 | DATE<br>04/29/02                                                                                                 | DATE<br>05/04/02                                                                                                  |
| SIGNATURE OF INVENTOR 204<br> | SIGNATURE OF INVENTOR 205<br> | SIGNATURE OF INVENTOR 206                                                                                         |
| DATE<br>05/02/02                                                                                                 | DATE<br>05/14/02                                                                                                 | DATE                                                                                                              |
| SIGNATURE OF INVENTOR 207                                                                                        | SIGNATURE OF INVENTOR 208                                                                                        | SIGNATURE OF INVENTOR 209                                                                                         |
| DATE                                                                                                             | DATE                                                                                                             | DATE                                                                                                              |
| SIGNATURE OF INVENTOR 210                                                                                        | SIGNATURE OF INVENTOR 211                                                                                        | SIGNATURE OF INVENTOR 212                                                                                         |
| DATE                                                                                                             | DATE                                                                                                             | DATE                                                                                                              |